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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/453,772	12/03/1999	YUZURU SUZUKI	3045-2339	3036

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R HAFERKAMP  
HOWELL & HAFERKAMP LC  
7733 FORSYTH BOULEVARD  
SUITE 1400  
ST. LOUIS, MO 63105

EXAMINER
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PEREZ, GUILLERMO

ART UNIT	PAPER NUMBER
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2834

DATE MAILED: 02/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

## Application No.

09/453,772

## Applicant(s)

SUZUKI ET AL.

## Examiner

Guillermo Perez

## Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 14 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 14, 2002 has been entered.

### ***Claim Objections***

Claim 1 is objected to because of the following informalities: on claim 1, lines 4-5 the phrase "... and a cylindrical ring provided on outer peripheral edges one of said planar yokes;..." needs to be corrected at the area underlined, for clarity.

On claim 2, line 7 the word "an" should be replaced by ---a---. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-5 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu (U. S. Pat. No. 4,656,381) in view of Atsumi et al. (U. S. Pat. No. 5,113,107) and further in view of Tojo et al. (U. S. Pat. No. 5,996,554).

Komatsu discloses a claw pole type actuator of a single-phase structure (figure 25), comprising:

a stator yoke composed of a pair of substantially circular planar yokes (112, 115) formed of a soft magnetic material,

a number N of polar teeth (113, 114, 116, 117) which axially protrude from inner peripheral edges of the respective planar yokes and which are disposed to face each other, extending in an axial direction, and

a cylindrical ring (112b, 115b) provided on outer peripheral edges of one of the planar yokes. Komatsu discloses an armature (120) being constituted by installing a coil (119) formed by winding a magnetic wire (118) in a coil receiving section shaped like an annular recess formed by the planar yokes, the polar teeth, and the cylindrical ring of the stator yoke. Komatsu discloses a rotor (110) being concentrically disposed within the stator yoke having a number N of magnetic poles. Komatsu discloses a rotor being adapted to repetitive rotational movement within a set angular range in response to energizing of the coil.

Komatsu discloses a stator assembly which has flanges (121, 122) with bearing provided on both end surfaces of the armature and in which a rotor provided with a magnet for a magnetic field composed of a permanent magnet being installed to face the polar teeth of the stator with a minute gap provided there between. Komatsu

discloses that a number of the polar teeth equals the number  $N$  of rotor magnetic poles (figure 26). Komatsu discloses that the stator yoke is comprised of a first stator yoke in which a planar yoke and a polar tooth are combined into one piece, and a second stator yoke in which a planar yoke, a polar tooth and a cylindrical ring are combined into one piece. Komatsu discloses that the polar teeth of the first and second stator yokes, respectively, are disposed at a spacing of approximately 180 degrees in terms of an electrical angle.

Komatsu discloses a pair of stator yokes, each being composed of the planar yoke and the cylindrical ring that are combined into one piece, are disposed to face each other. Komatsu discloses that the flanges are composed of a nonmagnetic material (column 11, lines 64-65).

However, Komatsu does not disclose that the angular range is less than 360 degrees and have its endpoints defined by a first angular position and a second angular position. Komatsu does not disclose that the rotor is further adapted to be held in either the first angular position or the second angular position by a detent torque when the coil is de-energized. Komatsu does not disclose that the rotation of the rotor is restricted by a stopper so that a maximum angle of the rotational motion stays within a range of  $120/N$  to  $240/N$  degrees. Komatsu does not disclose that the stopper is incorporated in the actuator.

Atsumi et al. disclose a rotor (42 in figure 4) being adapted to repetitive rotational movement within a set angular range (figure 2 and column 4, lines 11-17). Atsumi et al. disclose that a rotation of the rotor (42) is restricted by a stopper (7) so that a maximum

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angle of the rotational motion stays within a range of 120/N to 240/N degrees (column 1, lines 9-13 and column 4, lines 12-17). Atsumi et al. disclose that the stopper (7) is incorporated in the actuator (1). The invention of Atsumi et al. has the purpose of limiting the rotation to a limited angular range in a clockwise and counterclockwise direction.

Tojo et al. disclose that the angular range is less than 360 degrees and have its endpoints defined by a first angular position and a second angular position (column 5, lines 3-23). Tojo et al. disclose that the rotor (41) is further adapted to be held in either the first angular position or the second angular position by a detent torque (provided by the return spring 17) when the coil is de-energized (column 5, lines 20-23). Tojo et al. disclose that the stopper (13) is incorporated in the actuator (10). The purpose being that of controlling the throttle valve of an air-passage.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of a single-phase structure of Komatsu and provide it with the rotor and stopper configuration as disclosed by Atsumi et al. and Tojo et al. for the purpose of limiting the rotation to a limited angular range in a clockwise and counterclockwise direction.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to restrict the rotation of the rotor to a range of 120/N to 240/N degrees since it has been held that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges

by routine experimentation. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

2. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Atsumi et al. and further of Tojo et al. as applied to claim 1 above, and of Yamaguchi et al. (U.S. Pat. No. 5,373,207).

Komatsu, Atsumi et al. and Tojo et al. disclose a claw pole type actuator as described on item 1 above. However, neither Komatsu, Atsumi et al. nor Tojo et al. disclose a groove or a cut for destroying magnetic balance is provided in an axial direction on a central portion of one of south pole and north pole of the magnet for magnetic field.

Yamaguchi et al. disclose a groove or a cut (figure 9) destroying magnetic balance being provided in an axial direction on a central portion of either a south pole or north pole of the magnet. The invention of Yamaguchi et al. has the purpose of producing a vibration during the operation of the motor.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of Komatsu, Atsumi et al. and Tojo et al. and provide it with the cut disclosed by Yamaguchi et al. for the purpose of producing a vibration during the operation of the motor.

3. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Atsumi et al. and further of Tojo et al. as applied to claim 1 above, and of Haydon et al. (U. S. Pat. No. 4,274,026).

Komatsu, Atsumi et al. and Tojo et al. disclose a claw pole type actuator as described on item 1 above. However, neither Komatsu, Atsumi et al. nor Tojo et al. disclose that extensions of the two polar teeth in a circumferential direction are all the same and stay within a range of 220/N to 260/N degrees at central angle.

Haydon et al. disclose that extensions of the polar teeth in a circumferential direction are all the same and stay within a range of 220/N to 260/N degrees at central angle (figures 12-13 and column 9, lines 14-19). The invention of Haydon et al. has the purpose of improving the net usable torque of the rotor.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of Komatsu, Atsumi et al. and Tojo et al. and provide it with the extensions configuration disclosed by Haydon et al. for the purpose of improving the net usable torque of the rotor.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Atsumi et al. and further of Tojo et al. as applied to claim 1 above, and of Morril (U.S. Pat. No. 5,260,620).

Komatsu, Atsumi et al. and Tojo et al. disclose a claw pole type actuator as described on item 1 above. However, neither Komatsu, Atsumi et al. nor Tojo et al. disclose that air gaps in a radial direction formed by the polar teeth and the rotor magnet are uneven. Neither Komatsu, Atsumi et al. nor Tojo et al. disclose that air gaps at central portions of the polar teeth are narrower than air gaps at ends of the polar teeth.



Morril discloses air gaps (figure 5) in a radial direction formed by the polar teeth (16) and the rotor magnet are uneven. Morril discloses that air gaps at central portions of the polar teeth are narrower than air gaps at ends of the polar teeth. Morril's invention has the purpose of improving torque, speed and efficiency in the motor.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of Komatsu, Atsumi et al. and Tojo et al. and provide it with the air gap configuration disclosed by Morril for the purpose of improving torque, speed and efficiency in the motor.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Atsumi et al., and further of Tojo et al. as applied to claim 1 above, and further in view of Horst (U. S. Pat. No. 5,122,697).

Komatsu, Atsumi et al. and Tojo et al. disclose a claw pole type actuator as described on item 1 above. However, neither Komatsu, Atsumi et al. nor Tojo et al. disclose that a relationship between a detent torque  $T_d$  (Nm) and a rated torque  $T_{rate}$  (Nm) is as follows:

$$T_{rate}/4 \leq T_d \leq 3 T_{rate}/4; \text{ where:}$$

$T_{rate}$  denotes a maximum torque value obtained when a rated current is passed, and detent torque  $T_d$  denotes a maximum torque when a coil is in a de-energizing mode.

Horst discloses that a relationship between a detent torque  $T_d$  (Nm) and a rated torque  $T_{rate}$  (Nm) is as follows:

$$T_{rate}/4 \leq T_d \leq 3 T_{rate}/4$$

where  $T_{rate}$  denotes a maximum torque value obtained when a rated current is passed, and detent torque  $T_d$  denotes a maximum torque when a coil is in a de-energizing mode (figure 2 and column 5, lines 1-26). Horst's invention has the purpose of providing rotor torque when the coil-excited reluctance torque is zero or negligible.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of Komatsu, Atsumi et al. and Tojo et al. and provide it with the torque relationship disclosed by Horst for the purpose of providing rotor torque when the coil-excited reluctance torque is zero or negligible.

### ***Response to Arguments***

Applicant's arguments filed January 14, 2002 have been fully considered but they are not persuasive. In response Applicant's argument that Tojo does not teach or suggest the limitation of a rotor being adapted to be held in a rotational position by a detent torque when the coil is de-energized because Tojo eliminates detent torque, it must be noted that Tojo eliminate the magnetic torque applied to the rotor during de-energizing (column 1, lines 35-36), but uses a spring (17) to perform a mechanical detent torque on the rotor during de-energizing (column 5, lines 19-23). A detent torque as claimed is being performed on the rotor during de-energizing in the Tojo reference.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Guillermo Perez whose telephone number is (703) 306-5443. The examiner can normally be reached on Monday through Thursday and alternate Fridays.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on (703) 308 1371. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305 3432 for regular communications and (703) 305 3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956.

Guillermo Perez  
February 8, 2002



Nicholas Ponomarenko  
Primary Examiner  
Technology Center 2800